

CLAIMS

What is claimed is:

1. A method of making a molded article (10), wherein the molded article (10) comprises a paint layer (12) and a polyurethane layer (14), said method comprising
5 the steps of:

applying a paint composition to a surface (22) of a mold (18, 20) to form the paint layer (12);

infusing the paint layer (12) with a base; and

adhering the polyurethane layer (14) to the paint layer (12).
- 10 2. A method as set forth in claim 1 wherein the base includes a metal selected from the group of alkali metals, alkaline earth metals, and mixtures thereof.
3. A method as set forth in claim 2 wherein the base is selected from the group of potassium hydroxide, sodium hydroxide, lithium hydroxide, and mixtures thereof.
- 15 4. A method as set forth in claim 1 wherein the step of infusing the paint layer (12) with the base is further defined as infusing the paint layer (12) with at least 0.2 parts by weight of the base, based on 100 parts by weight of the paint composition.
5. A method as set forth in claim 4 wherein the step of infusing the paint layer (12) with the base is further defined as mixing the base into the paint composition
20 prior to applying the paint composition to the surface (22) of the mold (18, 20).

6. A method as set forth in claim 4 wherein the step of infusing the paint layer (12) with the base is further defined as spraying the base onto the paint layer (12) prior to said step of adhering the polyurethane layer (14) to the paint layer (12).

7. A method as set forth in claim 6 wherein the step of spraying the base onto the paint layer (12) is further defined as spraying a solution including at least 0.2 parts by weight of the base, based on 100 parts by weight of the solution, onto the paint layer (12).

8. A method as set forth in claim 1 wherein the paint composition comprises a water-based latex composition.

9. A method as set forth in claim 1 wherein the paint composition comprises a urethane-based composition.

10. A method as set forth in claim 1 wherein the paint composition comprises an acrylic-based composition.

11. A method as set forth in claim 1 wherein the paint composition comprises a vinyl-based composition.

12. A method as set forth in claim 1 further comprising the step of applying a mold release agent to the surface (22) of the mold (18, 20) prior to said step of applying the paint composition to the surface (22) of the mold (18, 20).

13. A method as set forth in claim 1 wherein the step of adhering the polyurethane layer (14) is further defined as spraying the polyurethane layer (14) onto the paint layer (12) into which the base has been infused and allowing a reaction to take place between an isocyanate component in the polyurethane layer (14) and the paint

composition to increase the adhesion between the paint layer (12) and the polyurethane layer (14).

14. A method as set forth in claim 1 further comprising the steps of mixing an isocyanate component and an isocyanate-reactive component outside of the open mold (18) to form a polyurethane composition and applying said polyurethane composition to the paint layer (12), thereby forming the polyurethane layer (14).

15. A method as set forth in claim 1 further comprising the steps of mixing an isocyanate component and an isocyanate-reactive component in the open mold (18) to form a polyurethane composition and applying said polyurethane composition to the paint layer (12), thereby forming the polyurethane layer (14).

16. A method as set forth in claim 1 wherein the step of applying the paint composition is further defined as applying the paint composition to the surface (22) of an open mold (18).

17. A method as set forth in claim 16 further comprising the step of closing the open mold (18) to produce a closed mold (20) prior to said step of adhering the polyurethane layer (14) to the paint layer (12).

18. A method as set forth in claim 17 wherein the step of adhering the polyurethane layer (14) to the paint layer (12) is further defined as reaction injection molding the polyurethane layer (14) onto the paint layer (12) into which the base has been infused and allowing a reaction to take place between an isocyanate component in

the polyurethane layer (14) and the paint composition to increase the adhesion between the paint layer (12) and the polyurethane layer (14)..

19. A method as set forth in claim 18 wherein the step of reaction injection molding the polyurethane layer (14) is further defined as mixing an isocyanate component and an isocyanate-reactive component outside of the closed mold (20) to form a polyurethane composition and injecting the polyurethane composition into the closed mold (20) and onto the paint layer (12), thereby forming the polyurethane layer (14).

20. A method as set forth in claim 18 wherein the step of reaction injection molding the polyurethane layer (14) is further defined as mixing an isocyanate component and an isocyanate-reactive component in the closed mold (20) to form a polyurethane composition in the closed mold (20) and applying the polyurethane composition onto the paint layer (12), thereby forming the polyurethane layer (14).

21. A method as set forth in claim 1 further comprising the step of heating the mold (18, 20) to a temperature of at least 145°F.

22. A molded article (10) made according to the method as set forth in claim 1.

23. A method of increasing adhesion between layers of a molded article (10), wherein the molded article (10) comprises a paint layer (12) and a polyurethane layer (14), said method comprising the steps of:

5 applying a paint composition comprising a water-based latex composition to a surface (22) of an open mold (18) to form the paint layer (12);

spraying an alkali metal hydroxide solution onto the paint layer (12) ;

adhering the polyurethane layer (14) to the paint layer (12) in the mold (20).

24. A method as set forth in claim 23 wherein the alkali metal hydroxide solution comprises potassium hydroxide.

10 25. A method as set forth in claim 23 wherein the step of spraying the alkali metal hydroxide solution onto the paint layer (12) is further defined as spraying a solution including at least 0.2 parts by weight of potassium hydroxide, based on 100 parts by weight of the solution, onto the paint layer (12).

15 26. A method as set forth in claim 23 further comprising the step of applying a mold release agent to the surface (22) of the open mold (18) prior to said step of applying the paint composition to the surface (22) of the mold (18).

27. A method as set forth in claim 23 further comprising the step of closing the open mold (18) to produce a closed mold (20) prior to said step of adhering the polyurethane layer (14) to the paint layer (12).

28. A method as set forth in claim 23 wherein the step of adhering the polyurethane layer (14) to the paint layer (12) is further defined as reaction injection molding the polyurethane layer (14) in the closed mold (20).

29. A method as set forth in claim 28 wherein the step of reaction injection molding the polyurethane layer (14) is further defined as mixing an isocyanate component and an isocyanate-reactive component outside of the closed mold (20) to form a polyurethane composition and injecting the polyurethane composition into the closed mold (20) and onto the paint layer (12), thereby forming the polyurethane layer (14).

30. A method as set forth in claim 28 wherein the step of reaction injection molding the polyurethane layer (14) is further defined as mixing an isocyanate component and an isocyanate-reactive component in the closed mold (20) to form a polyurethane composition in the closed mold (20) and applying the polyurethane composition onto the paint layer (12), thereby forming the polyurethane layer (14).

31. A method as set forth in claim 23 further comprising the step of heating the closed mold (20) to a temperature of at least 145°F.

32. The molded article (10) made according to the method as set forth in claim 23.

33. A method of increasing adhesion between layers of a molded article (10), wherein the molded article (10) comprises a paint layer (12) and a polyurethane layer (14), said method comprising the steps of:

5 mixing an alkali metal hydroxide solution into a paint composition comprising a water-based latex composition;

applying the paint composition to a surface (22) of an open mold (18) to form the paint layer (12);

adhering the polyurethane layer (14) to the paint layer (12) in the mold (20).

34. A method as set forth in claim 33 wherein the alkali metal hydroxide solution comprises potassium hydroxide.

35. A method as set forth in claim 33 wherein the step of mixing the alkali metal hydroxide solution into the paint composition is further defined as mixing at least 0.2 parts by weight of potassium hydroxide, based on 100 parts by weight of the solution, into the paint composition.

15 36. A method as set forth in claim 33 further comprising the step of applying a mold release agent to the surface (22) of the open mold (18) prior to said step of applying the paint composition to the surface (22) of the mold (18).

37. A method as set forth in claim 33 further comprising the step of closing the open mold (18) to produce a closed mold (20) prior to said step of adhering the polyurethane layer (14) to the paint layer (12).

38. A method as set forth in claim 33 wherein the step of adhering the polyurethane layer (14) to the paint layer (12) is further defined as reaction injection molding the polyurethane layer (14) in the closed mold (20).

39. A method as set forth in claim 38 wherein the step of reaction injection molding the polyurethane layer (14) is further defined as mixing an isocyanate component and an isocyanate-reactive component outside of the closed mold (20) to form a polyurethane composition and injecting the polyurethane composition into the closed mold (20) and onto the paint layer (12), thereby forming the polyurethane layer (14).

40. A method as set forth in claim 38 wherein the step of reaction injection molding the polyurethane layer (14) is further defined as mixing an isocyanate component and an isocyanate-reactive component in the closed mold (20) to form a polyurethane composition in the closed mold (20) and applying the polyurethane composition onto the paint layer (12), thereby forming the polyurethane layer (14).

41. A method as set forth in claim 33 further comprising the step of heating the closed mold (20) to a temperature of at least 145°F

42. The molded article (10) made according to the method as set forth in claim 33.

43. A method of making a molded article (10), wherein the molded article (10) comprises a paint layer (12) and a polyurethane layer (14), said method comprising the steps of:

providing the paint layer (12);

5 infusing the paint layer (12) with a base; and

applying and adhering the polyurethane layer (14) to the paint layer (12).

44. A method as set forth in claim 43 wherein the step of providing the paint layer comprises applying a paint composition to a substrate to form the paint layer (12).

45. A method as set forth in claim 43 wherein the step of providing the paint
10 layer comprises spraying a paint composition to a surface of a mold (22) to form the paint layer (12).

46. A method as set forth in claim 43 wherein the base includes a metal selected from the group of alkali metals, alkaline earth metals, and mixtures thereof.

47. A method as set forth in claim 46 wherein the base is selected from the
15 group of potassium hydroxide, sodium hydroxide, lithium hydroxide, and mixtures thereof.

48. A method as set forth in claim 44 wherein the step of infusing the paint layer (12) with the base is further defined as infusing the paint layer (12) with at least 0.2 parts by weight of the base, based on 100 parts by weight of the paint composition.

49. A method as set forth in claim 48 wherein the step of infusing the paint layer (12) with the base is further defined as mixing the base into the paint composition prior to applying the paint composition to the surface (22) of the mold (18, 20).

50. A method as set forth in claim 48 wherein the step of infusing the paint
5 layer (12) with the base is further defined as spraying the base onto the paint layer (12) prior to said step of applying and adhering the polyurethane layer (14) to the paint layer (12).

51. A method as set forth in claim 50 wherein the step of spraying the base
10 onto the paint layer (12) is further defined as spraying a solution including at least 0.2 parts by weight of the base, based on 100 parts by weight of the solution, onto the paint layer (12).

52. A method as set forth in claim 44 wherein the paint composition comprises a water-based latex composition, a urethane-based composition, an acrylic-based composition or a vinyl-based composition.

15 53. A method as set forth in claim 45 further comprising the step of applying a mold release agent to the surface of the mold (22) prior to said step of applying the paint composition to the surface of the mold (22).

54. A method as set forth in claim 45 further comprising the step of heating the mold (18, 20) to a temperature of at least 145°F.

20 55. A molded article (10) made according to the method as set forth in claim 43.